



Boston University Questrom School of Business

# Are Platform Firms Different?

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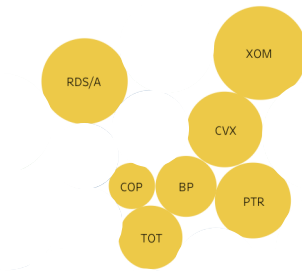


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## Platforms are replacing Oil & Banking at the top



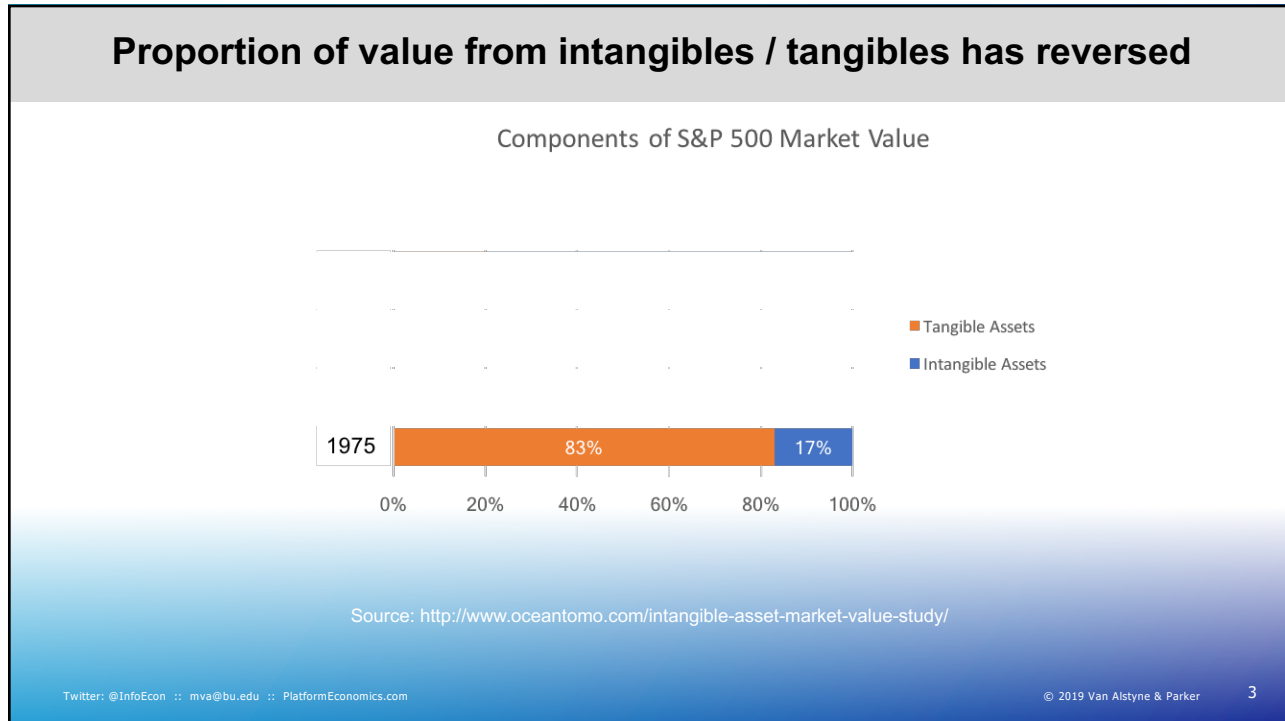
Sector	Top 7 Market Cap
Oil	\$1.5 T

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### Platforms employ an order of magnitude fewer resources

Firm	Start year	Employees	Mkt Cap (\$B)
BMW	1916	131,000	40
Uber	2009	16,000	54
Marriott	1927	177,000	39
Airbnb	2008	10,000	38
Walt Disney	1923	199,000	236
Facebook	2004	30,000	514
IBM	1911	350,000	127
Salesforce	1999	35,000	133
New York Times	1851	3,700	5
Twitter	2006	3,300	33

**Platforms are "inverted firms" having shifted production from inside to outside**

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## Platforms appear different by the numbers

Variable	Forbes Global 2000	Industry Control Sample (minus the 43 platforms)	All Digital Platforms	Innovation Platforms	Transaction Platforms
Number of Firms	1,939	100	43	18	25
Sales (Million\$)	\$5,586	\$4,845	\$ 4,335	\$10,118	\$ 2,119
Employees	18,900	19,000	9,872***	26,600	6,349
Operating Profit %	13%	12%	21%***	21%	21%
Market Value (Million\$)	\$6,876	\$8,243	\$21,726***	\$37,901	\$13,277
Mkt Value-Sales Multiple	1.39	1.94	5.35***	4.19	7.07
R&D/Sales	4%	9%	13%***	13%	11%
S&M + G&A/Sales	16%	17%	24%***	22%	33%
Growth Sales	8%	9%	18%***	13%	29%
Growth Market Value	10%	8%	14%***	12%	21%
Observations	5,121	1,018	374	239	135

Notes: \*\*\* =  $p < 0.001$  for Industry Sample vs. All Digital Platforms comparison using two-sample Wilcoxon rank-sum (Mann-Whitney) test  
 Mkt Value-Sales Multiple = ratio of market value compared to prior year sales  
 S&M + G&A/Sales = Sales and Marketing Expenses + General and Administrative Expenses divided by Sales  
 Growth numbers refer to prior year data  
 Observations refer to number of years of data for each firm.

Source: Cusumano, Gawer, Yoffie "Business of Platforms"

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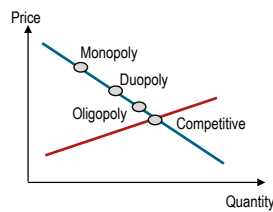
## Antitrust Challenges

### Market Share Dominance



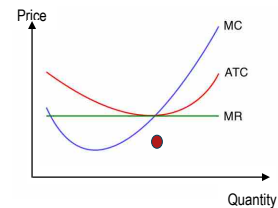
Is Amazon in books, cloud, publishing, ecommerce, home devices, groceries? Is Alibaba in ecommerce, health ins, cloud, payments, banking, movies, logistics? Is Google in email, search, maps, home devices, self-driving cars?

### Restricted Output



Google doesn't restrict searches, maps or email. Alibaba and Amazon don't restrict sales. Facebook doesn't restrict posts or reads.

### Predatory Pricing



$P < MC$  is test of predation but profit maximizing price in platform markets is often free!

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1. Why do platform firms have high market capitalization but so few employees?
2. How do platform firms scale so fast?
3. How do platform firms constantly beat product firms?
4. Why is the shift in executive mindset so hard?
5. What is the right regulation? Will interventions such as break up (antitrust), GDPR (privacy), or PSD2 (open banking) increase welfare?

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**A structural shift in the economy is leading to gigantic firms.  
This Internet era transition resembles the Industrial era transition  
... but for the opposite reason.**

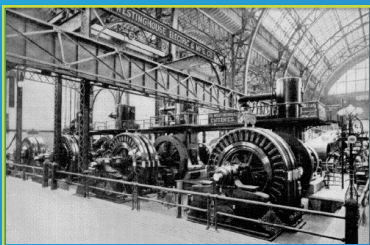
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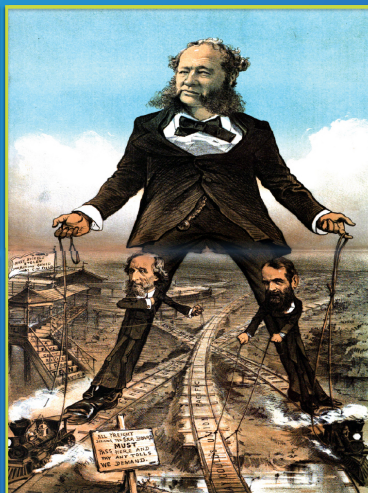
# Giants of Supply Side Economies of scale

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Electric Dynamo 1893



Acklam Ironworks 1924



Ford Model T 1908



Standard Oil  
Cross of (Rail) Roads

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# Giants of Demand Side Economies of scale

Desktops



Mobile



Media/Videos



Social Networks  
Instant Messaging



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## Economies of Scale

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### Supply Econ of Scale

- Falling average costs
- Monopoly production
- Utilities, Semiconductors

### Demand Econ of Scale

- Rising average value
- Monopoly consumption
- IM, Social Networks

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## Platform Ecosystems: How Developers Invert the Firm Model of Recursive Production with Spillovers

Platform sponsor can sell code  $V$  or give away share  $S=\sigma V$  as input to developers who pay royalty  $\Phi$  on output  $y$  across two periods.

$$\pi_p = V(1 - \sigma) + \phi p y_1 + \delta \phi p y_2$$

$$\pi_d = (1 - \phi) p y_1 + \delta(1 - \phi) p y_2$$

Output is Cobb Douglas. Public code is input to production, which is recursive across periods.

$$y_1 = k(\sigma V)^\alpha; \quad y_2 = k(y_1)^\alpha = k^{1+\alpha}(\sigma V)^{\alpha^2}$$

Increasing the number of developers  $N$  creates a natural positive externality

$$\pi_p = V - S + N \phi p y_1 + \delta N N^\alpha \phi p y_2$$

Open innovation is platform orchestration of 3<sup>rd</sup> party production

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## How should we organize production: Markets, Hierarchies or Platforms?

Platform

**Open Innovation:** The platform orchestrates. It chooses *openness* (i.e. how much  $\sigma$  to give away) and *competition policy* (i.e.  $t$  how long developers can earn  $\pi_d$  before their code goes to other developers). Developers own production.

Hierarchy

**Vertical Integration:** Platform makes all decisions *and* owns all production. This implies:

1. No subsidy cost  $\sigma$  reduction in profit
2. Ability to build on *all*  $V$  not just  $(1-\sigma)V$  and *no expiration* of property rights
3. Royalties  $\phi$  are 100%
4. ... but no spillover

Market

**Decentralized Market:**  $N$  developers decide independently. Each owns individual production:

1. Can publish code for  $N-1$  others to use at cost  $\delta v$  representing loss in pricing power
2. Can build on any published code from  $N-1$  other developers
3. Get spillover benefits in period 2 of  $(N-1)^\alpha$  when others publish
4. ... but individual profits higher when individual developers don't publish

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## The Inverted Firm Hypothesis

**Proposition 1:** *Vertical Integration* dominates *Open Innovation* for most parameter values. However, there is a unique network effect  $\bar{N}_d > N_d$  such that for all values greater than the threshold, *Open Innovation* dominates *Vertical Innovation*.

**Proposition 2:** If a finite proprietary period  $t < \infty$  maximizes profits, then  $N$  developers will prefer a contract that forces cooperation when the number of developers exceeds a threshold bounded by  $N_d > 2^{1/\alpha}$ . Then *Open Innovation* dominates *Decentralized Markets*

Externalities imply that platforms dominate both markets and hierarchies.  
*The firm “inverts:” production moves from inside to outside.*

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**In any market with network effects, the focus of attention must shift from inside to outside the firm.**

**Reason:** You can't *scale* network effects inside as easily as outside.

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**What Changes :: Marketing**

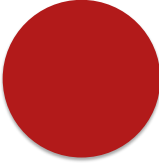


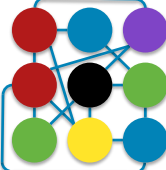
**Businesses shift from outbound messaging to inbound servicing**

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## Four Decades of Consumer Marketing

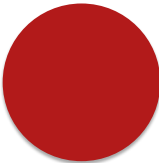
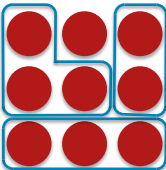

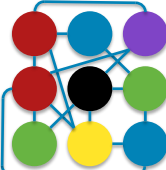
<b>1980's</b>	<b>1990's</b>	<b>2000's</b>	<b>2010's</b>
			
Single Message	Segmentation	Individual Targeting	Virality / Social Influence


Source: Rob Cain, CIO Coca Cola Company

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## Four Decades of Consumer Marketing

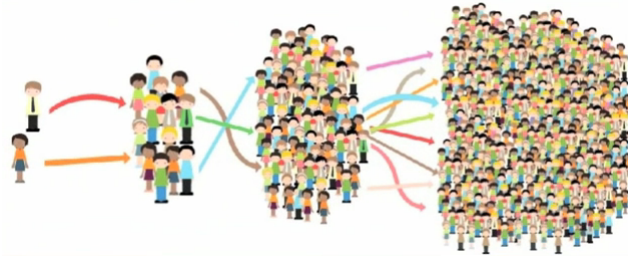
<b>1980's</b>	<b>1990's</b>	<b>2000's</b>	<b>2010's</b>
			
Single Message	Segmentation	Individual Targeting	Virality / Social Influence



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# Viral Marketing



Dropbox uses shared files, Instagram uses shared photos, OpenTable uses shared dinner reservation, PayPal used \$10 rewards



“...the path to profitable growth may lie in a company’s ability to get its ... customers to become, in effect, its marketing department.”

*Fred Reichheld HBR*

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## What Changes :: Operations & Logistics

Value creation shifts from internal to external servicing

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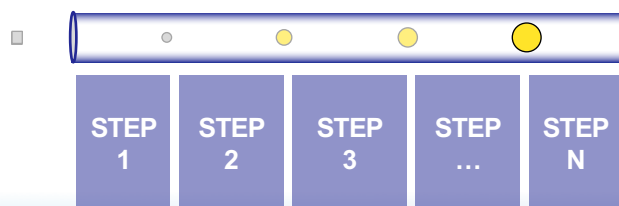
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## Value creation inside versus outside



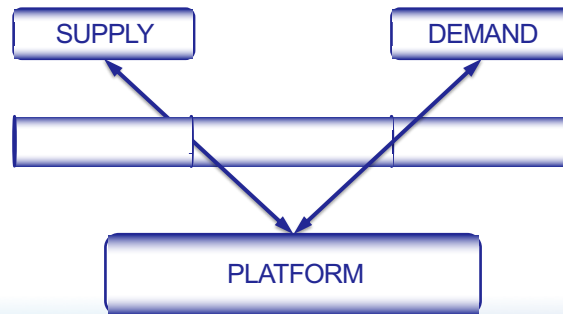
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## Value creation inside versus outside



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## Value creation inside versus outside



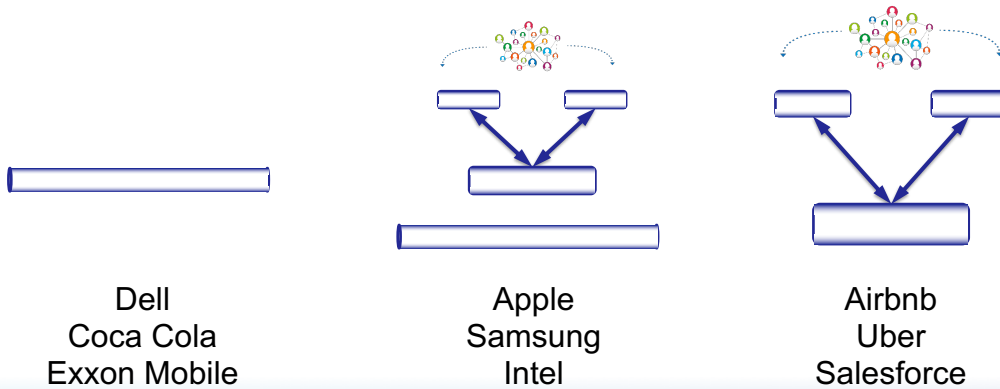
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## Business Models Can Overlap

Platforms Scale More than Pipes



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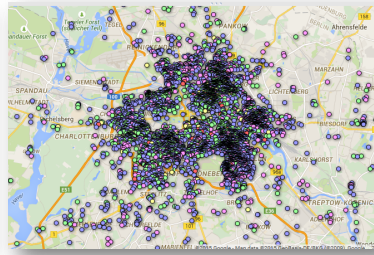
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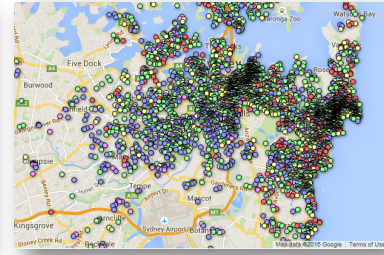
**Founded in 2008, Airbnb operates at global scale:  
1M+ listings, 34,000 cities, 180 countries**



40,000 listings



8,105 listings



5,692 listings

Identify spare capacity, scale across boundaries

Courtesy Peter Evans © 2019 Van Alstyne & Parker

Source: <http://tomslee.net/airbnb-data>, 2015

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“Uber, the world’s largest taxi company owns no vehicles, Facebook the world’s most popular media owner creates no content, Alibaba the most valuable retailer has no inventory, and Airbnb the world’s largest hotelier owns no real estate.”



*Tom Goodwin, Sr. VP of Strategy Havas Media*

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## What Changes :: Finance

### Shift from valuing assets to valuing community

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## Mergers & Acquisitions

- Notable Acquisitions
- Often appear to overpay initially
- Valuing the *external* community: professional networks, photographers, developers, videographers, data scientists...


#### Platform Consolidation– Selected acquisitions

LinkedIn	\$26.2B			
Skype	\$8.5B	}	}	Microsoft
GitHub	\$7.5B	}	}	
Waze	\$1.2B	}	}	Google
YouTube	\$1.7B	}	}	
Kaggle	\$1.0B	}	}	Facebook
Instagram	\$1.0B	}	}	
WhatsApp	\$19.0B	}	}	IBM
Oculus	\$2.0B	}	}	
Open Table	\$2.6B	}	}	Amazon
RedHat	\$34B	}	}	
Twitch	\$1B	}	}	

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Instagram sold for \$1B not because of contributions from 13 employees but from 30 million users



Capture and Share the World's Moments

Instagram is a fast, beautiful and fun way to share your life with friends and family.

Take a picture or video, choose a filter to transform its look and feel, then post to Instagram — it's that easy. You can even share to Facebook, Twitter, Tumblr and more. It's a new way to see the world.

Oh yeah, did we mention it's free?

Download on the App Store | GET IT ON Google play

ABOUT US SUPPORT BLOG PRESS API JOBS PRIVACY TERMS | © 2013 INSTAGRAM

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WENT TO THE MOON | WENT TO THE BATHROOM

TOOK 5 PHOTOS | TOOK 37 PHOTOS

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## What Changes :: Human Resources

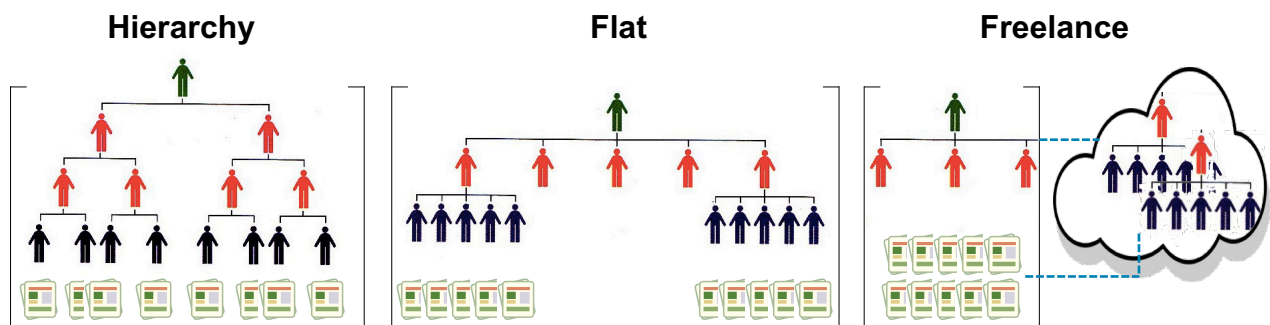
Emphasis shifts from employees to contractors,  
from internal experts to external crowds, and  
from subordinate dictation to community persuasion

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## Upwork outsources even middle management



Firms are accessing “cloud labor” at the team and individual level

© 2015 Marshall Van Alstyne

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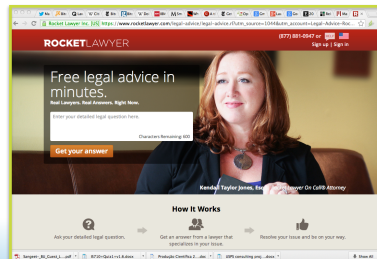
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## Gatekeepers replaced by crowds



Advice from travelers over travel agents



Advice from laymen & lawyers over lawyers on retainer



Work from freelance crowds over staff

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## What Changes :: Information Technology

IT Support Shifts from Inside to Outside the Firm

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## IT Support Becomes Increasingly Outward Focused



### ERP Back-Office Systems

*Inventory tracking, Restocking,  
Statistical Process Control. Product  
Planning, Human Resources, Workflow  
Management...*



### CRM Front-Office Systems

*Lead Tracking, Taking orders, Point  
of Sale Terminals, Price Quotes,  
Customer Support, Returns,  
Marketing Campaign Mgmt...*



### Social Media Out-of-Office Systems

*Community Building, Sentiment  
Analysis, Inbound Traffic  
Management, Content Scheduling,  
SEO Optimization, Media Monitoring*

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## Bezos Platform Mandate

1. All teams will expose their data...
2. Teams must communicate through interfaces.
3. ... no other form of interprocess communication allowed
4. Interfaces, without exception, must be **externalizable**.
5. Anyone who doesn't do this will be fired.



Source: Yegge Rant

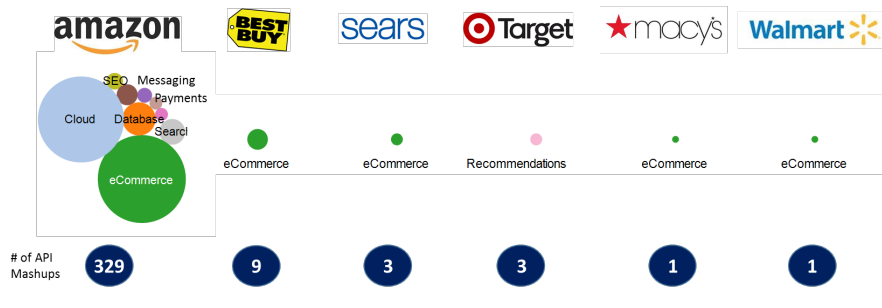
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## Who is Getting More 3<sup>rd</sup> Party Value Add?

### API Mashups: Amazon vs. Other Major Retail Enterprises



Source: Rahul Basole and Peter Evans, with data from ProgrammableWeb, Center for Global Enterprise, 2015

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## Amazon growth over 10 years 2491% vs. Walmart (48%), Target (23%), Macy's (-12%), Best Buy (-31%)



Logistics & supply chain squeezing have limits.  
External value add is much less limited.

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## What Changes :: R&D and Innovation

### Platforms Open Themselves to Third Party Contributions

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A platform is a system that can be... adapted to countless needs and niches that the platform's original developers could not possibly have contemplated..."



*Mark Andreessen: Venture Capitalist, Netscape Founder, Board HP, eBay*

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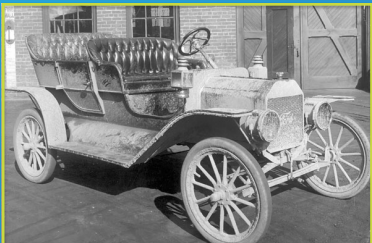
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## It's Working when Users do Something You Didn't Expect

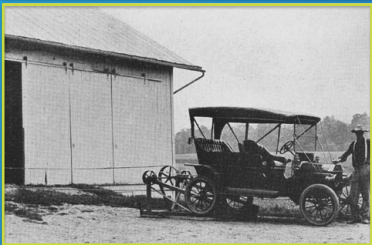
Ford Model T



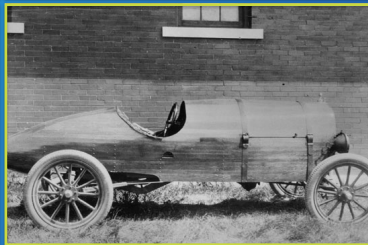
Hay Carrier



Flour Mill



Racecar



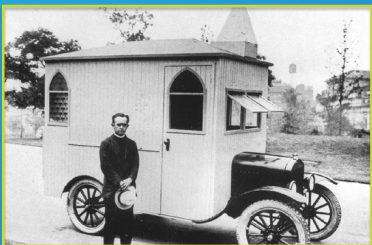
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## It's Working when Users do Something You Didn't Expect

Mobile Church



Snowmobile



Sawmill



Goat Carrier

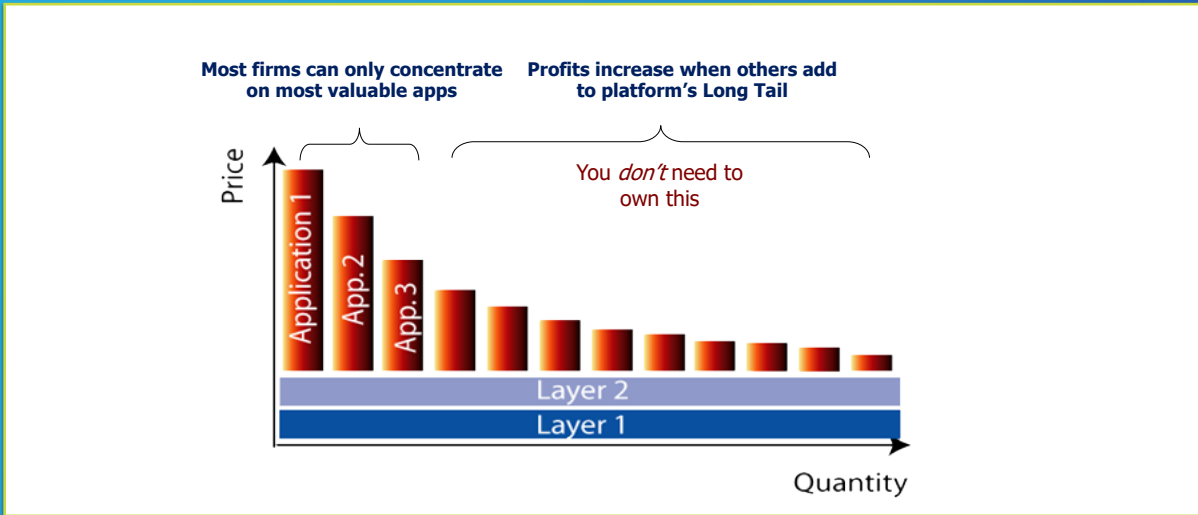


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## Platforms Get Enormous Value from 3rd Party Developers

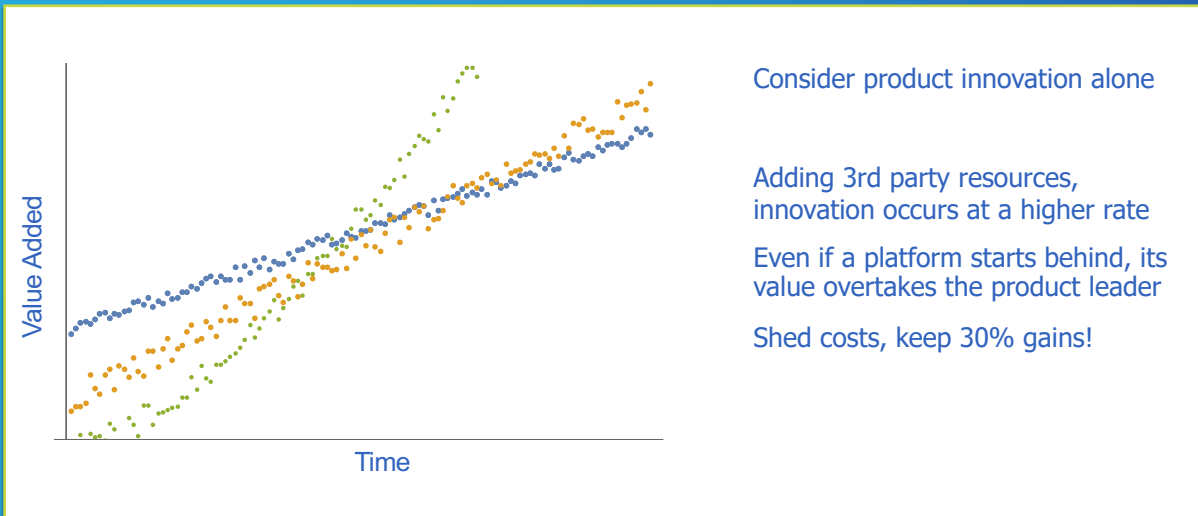


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## Why Platforms Beat Products



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## What Changes :: Strategy

**Goal shifts from control, entry barriers, and differentiation to more valuable market exchanges.**

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### Only 7 Firms Controlled 99% of Handset Profits in 2007

Economies of Scale  
 Famous Brands  
 Regulatory Protection  
 World Class Logistics  
 Global Sales Channels  
 ≥ \$40B twenty yr R&D by Nokia alone

Firm	Percentage
Nokia	55%
Samsung	10%
Sony Ericsson	10%
Motorola	8%
LG	7%
RIM	5%
HTC	5%
Other	1%

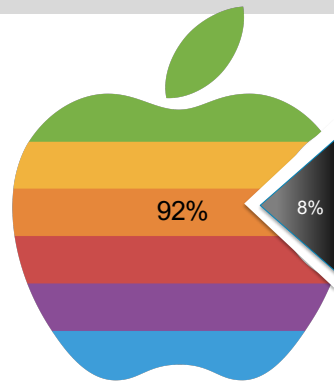
Source: Asymco

Nokia  
 Samsung  
 Sony Ericsson  
 Motorola  
 LG  
 RIM  
 HTC  
 Other

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**In 6 years, all but one had  $\leq 0$  profit while 1 newcomer had 92%**



Source: Business Insider  
Insight: Henry Tirri, former CTO Nokia

Is it likely all 7 incumbents had failed strategies, run by clueless management, lacking execution capabilities?

Or was something more fundamental happening?

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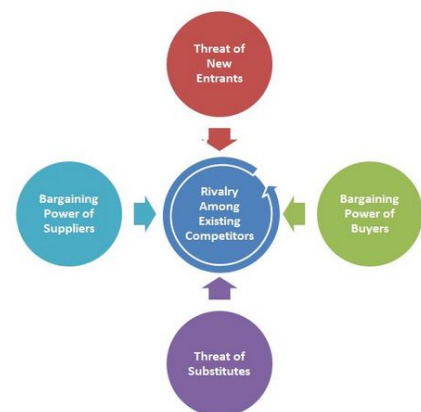
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## Porter's Five Forces & Resource Based View

1. Goal is a protected market niche, emphasizing industry barriers
2. Weapon is cost leadership or product differentiation
3. Inimitable resources you own provide sustained advantage




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## Platform Strategy Differs

1. Goal is interactions that yield NW effects - partner to partner value. NW effects provide sustainability
2. Promote frictionless entry of partners (not barriers for competitors)

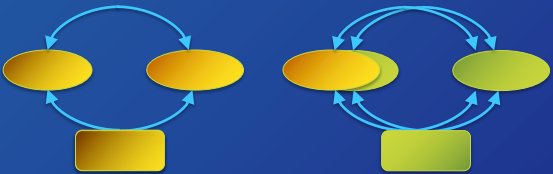


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## Platform Strategy Differs

1. Goal is interactions that yield NW effects - partner to partner value. NW effects provide sustainability
2. Promote frictionless entry of partners
3. Boundaries move as competitors can be complementors



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Platform Strategy Differs	
Product	Platform
Distinct: Buyers, Suppliers, Substitutes, Entrants, Rivals	– <b>Market Forces</b> – Overlap: Consumers ~ producers, competitors ~ complementors
Core Competencies	– <b>Focus</b> – Core Interactions
Supply Side	– <b>Scale Economies</b> – Demand Side
Own Inimitable Resources	– <b>Assets</b> – Community as Asset
Cost Leadership / Product Differentiation	– <b>Goal / Metric</b> – Engagement, Positive Spillovers, Just Governance
Barriers to Entry, Boulevards for Exit	– <b>Access</b> – Permissionless Entry, Open Around Key Control Points
By Firm	– <b>Innovation</b> – By Firm and Ecosystem

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## Network Effects & Inverting the Firm Changes... @InfoEcon

- **Finance**  
Shareholder Value → Stakeholder Value  
Incorporate network effects
- **Human Resources**  
Internal Employees →  
External communities
- **R&D**  
Experts & Specialized departments →  
Crowdsourcing & Open Innovation
- **Strategy**  
Entry Barriers & Inimitable Resources →  
Ecosystem husbandry & Long Tail
- **Marketing**  
Push → Pull, Outbound → Inbound
- **IT**  
Back Office (ERP) → Front Office (CRM) → Out-of-Office (Social & Big Data)
- **Operations & Logistics**  
Shed marginal costs  
Uber: no taxis, Airbnb: no real estate,  
Facebook: creates no content,  
Alibaba: no inventory.

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## Antitrust & The Inverted Firm Hypothesis

*Platforms v. Markets v. Hierarchies*

**Proposition 1:** *Vertical Integration* dominates *Open Innovation* for most parameter values. However, there is a unique network effect  $\bar{N}_d > N_d$  such that for all values greater than the threshold, *Open Innovation* dominates *Vertical Innovation*.

**Proposition 2:** If a finite proprietary period  $t < \infty$  maximizes profits, then  $N$  developers will prefer a contract that forces cooperation when the number of developers exceeds a threshold bounded by  $N_d > 2^{1/\alpha}$ . Then *Open Innovation* dominates *Decentralized Markets*

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## Antitrust & The Inverted Firm Hypothesis

*Platforms v. Markets v. Hierarchies*

**Proposition 1:** Platform breakup fragments the user base *reducing* the scale of network effects. It creates competition (affecting prices) but destroys value (affecting production).

**Proposition 2:** If a finite proprietary period  $t < \infty$  maximizes profits, then  $N$  developers will prefer a contract that forces cooperation when the number of developers exceeds a threshold bounded by  $N_d > 2^{1/\alpha}$ . Then *Open Innovation* dominates *Decentralized Markets*

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## How does value rise with Network Effects?

### But if we break competitive access to granola and WhatsApp?

*Metcalfe's Law*

$(n + m)^2$   
 $n^2$   
 $3\left(\frac{n}{3}\right)^2 = \frac{1}{3}n^2$

**Breakup destroys value relative to other kinds of interventions**

**Competitive access adds users. Consider "essential facilities" doctrine: Don't have 3 firms lay railroad tracks. Have 3 firms compete to deliver over the same tracks**

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## Antitrust & The Inverted Firm Hypothesis

### *Platforms v. Markets v. Hierarchies*

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## Antitrust & The Inverted Firm Hypothesis

*Platforms v. Markets v. Hierarchies*

**Proposition 1:** Platform breakup fragments the user base *reducing* the scale of network effects. It creates competition (affecting prices) but destroys value (affecting production).

**Proposition 2:** GDPR restores privacy but creates islands of negotiation and hidden information. Overall it reduces value.

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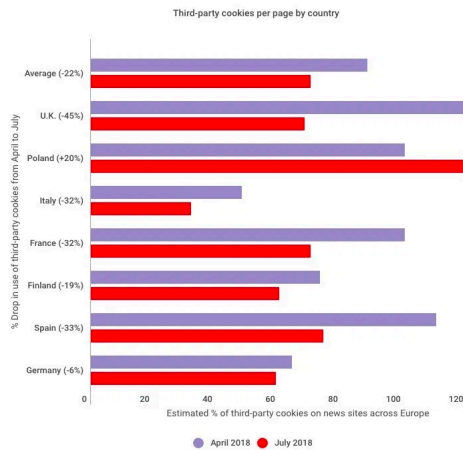
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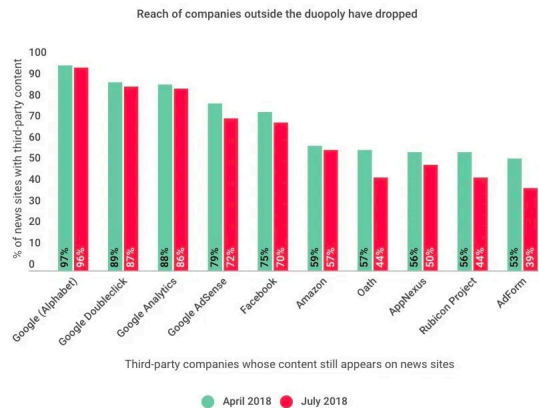
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## Effects of GDPR

### Use of Cookies Falls



### Small firms lose ground to duopoly



- 77% of marketers believe ad targeting is more difficult (source: siztek)
- VC firms invest fewer € in EU startups

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Source: Reuters Institute for Study of Journalism  
<https://digiday.com/media/impact-gdpr-5-charts/>

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**1. Why do platform firms have high market capitalization but so few employees?**

- Inverted firms harness users as producers, representing an external labor force, not counted among the traditional workforce.

**2. How do platform firms scale so fast?**

- Shifting production outside, they can have zero marginal costs. Uber does not own its cars. Airbnb does not own its rooms. Facebook does not produce its own content. Not incurring the costs of production, they can scale as fast as they can add partners.

**3. How do platform firms constantly beat product firms?**

- Platform value appreciates through use whereas product value depreciates through use. Platforms harness resources they do not own. Innovation happens at a faster pace.

**4. Why is the shift in executive mindset so hard?**

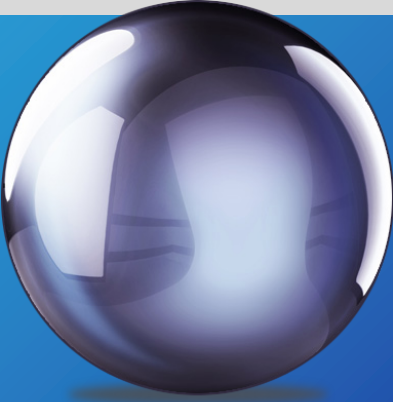
- Executives familiar with managing proprietary control must transition to managing open orchestration, from resources they control to resources unknown partners must volunteer.

**5. What is the right regulation? Will interventions such as break up (antitrust), GDPR (privacy), or PSD2 (open banking) increase welfare?**

- Breakup would increase competition but decrease network effects and reduce value. GDPR restores privacy but creates islands of negotiation and hidden information, reducing value. By contrast, PSD2 acts like “essential facilities” doctrine and enables competition on network resources, creating value.

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**What's Next?**

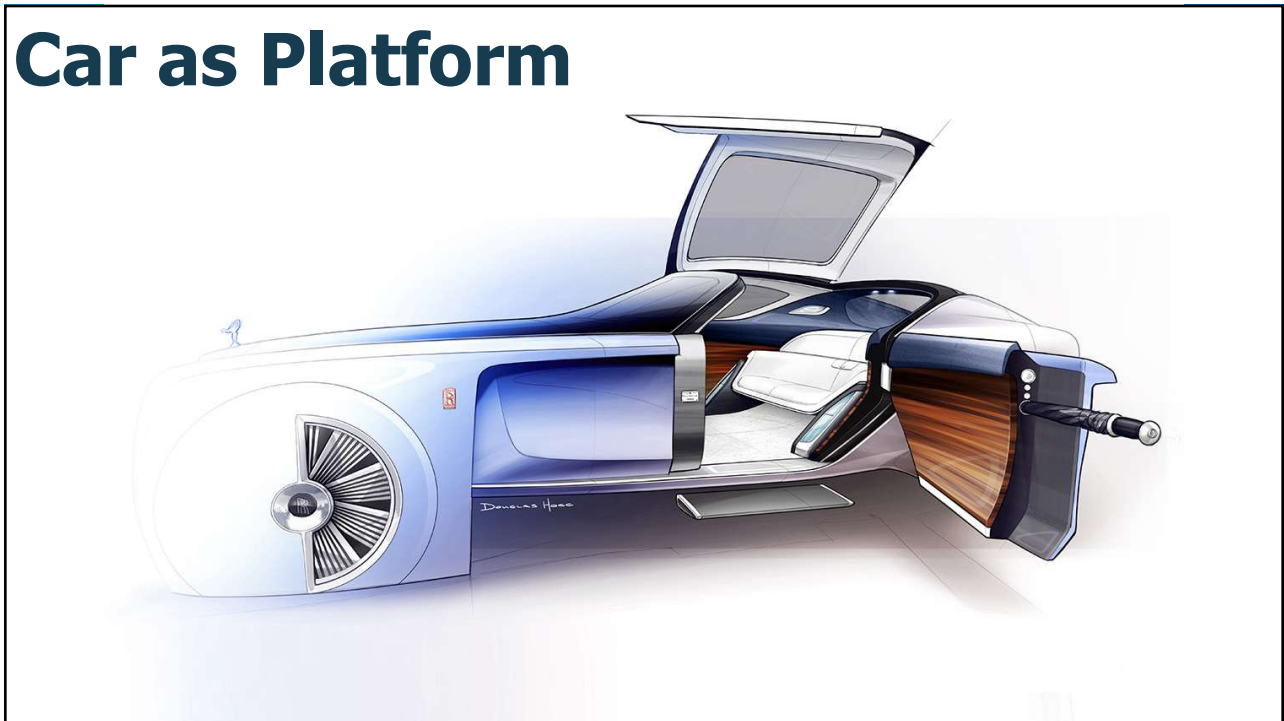


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# Car as Platform



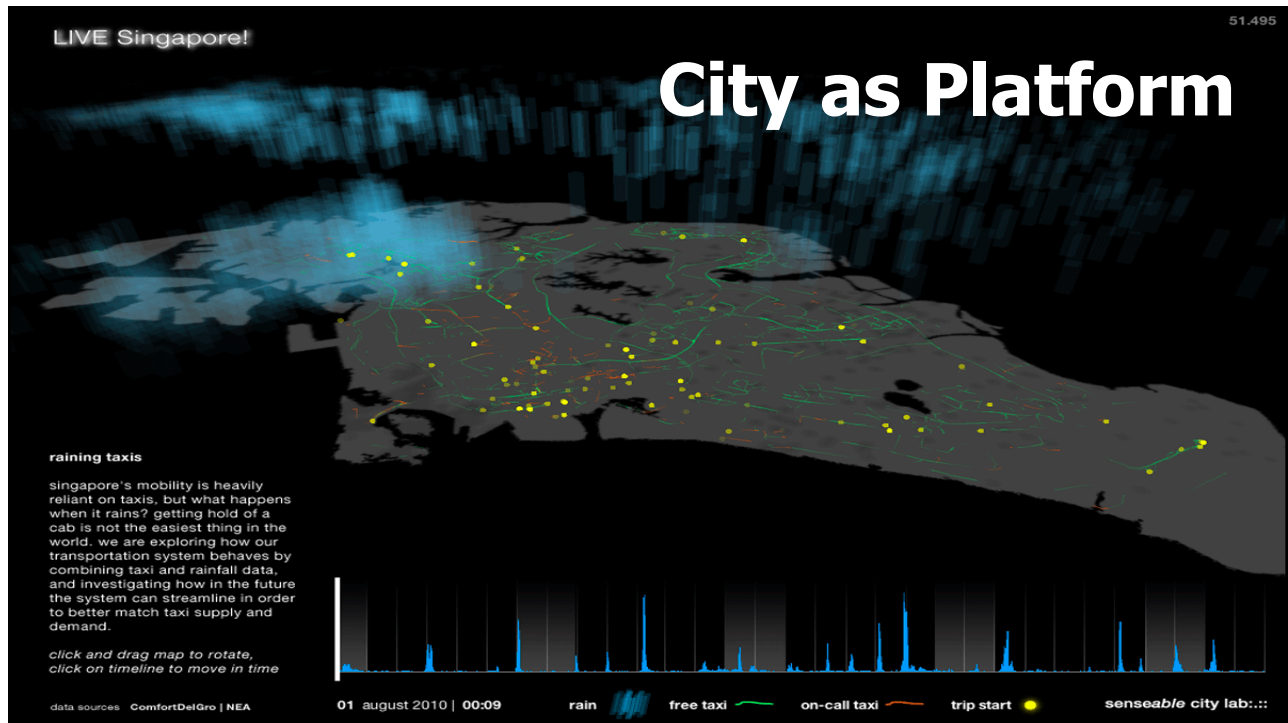
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# Block Chain & Finance as Platform

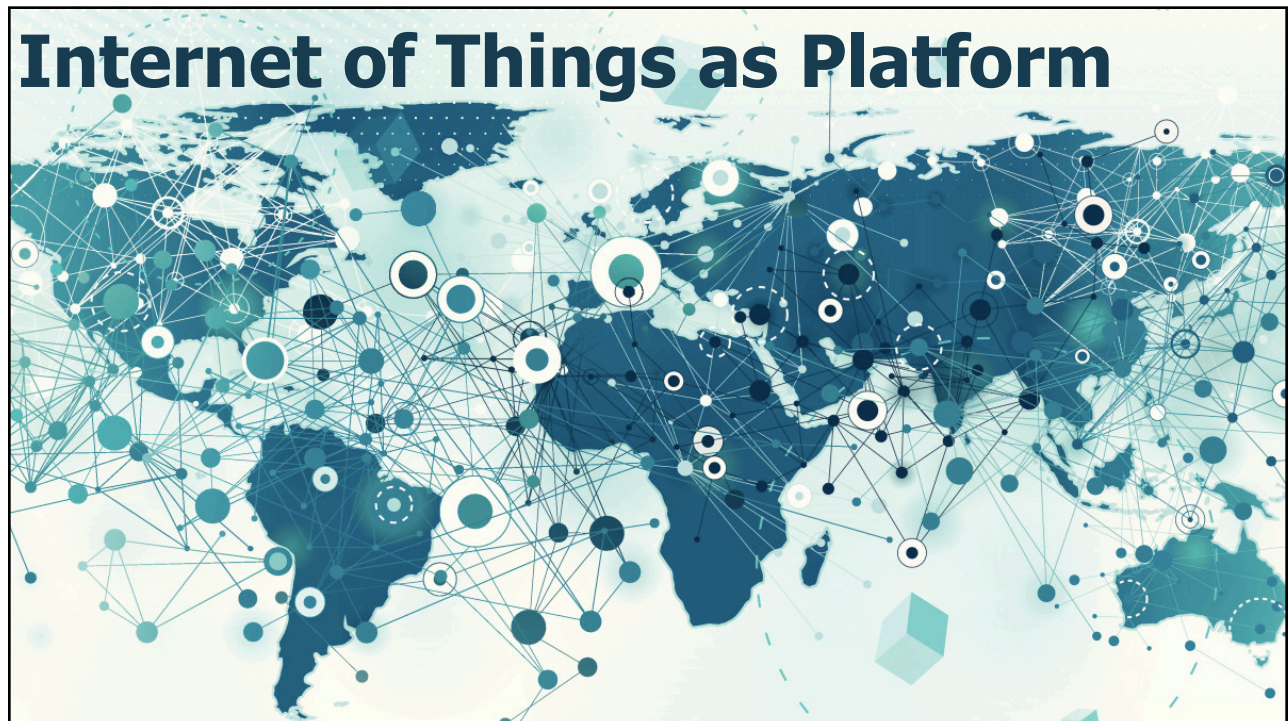


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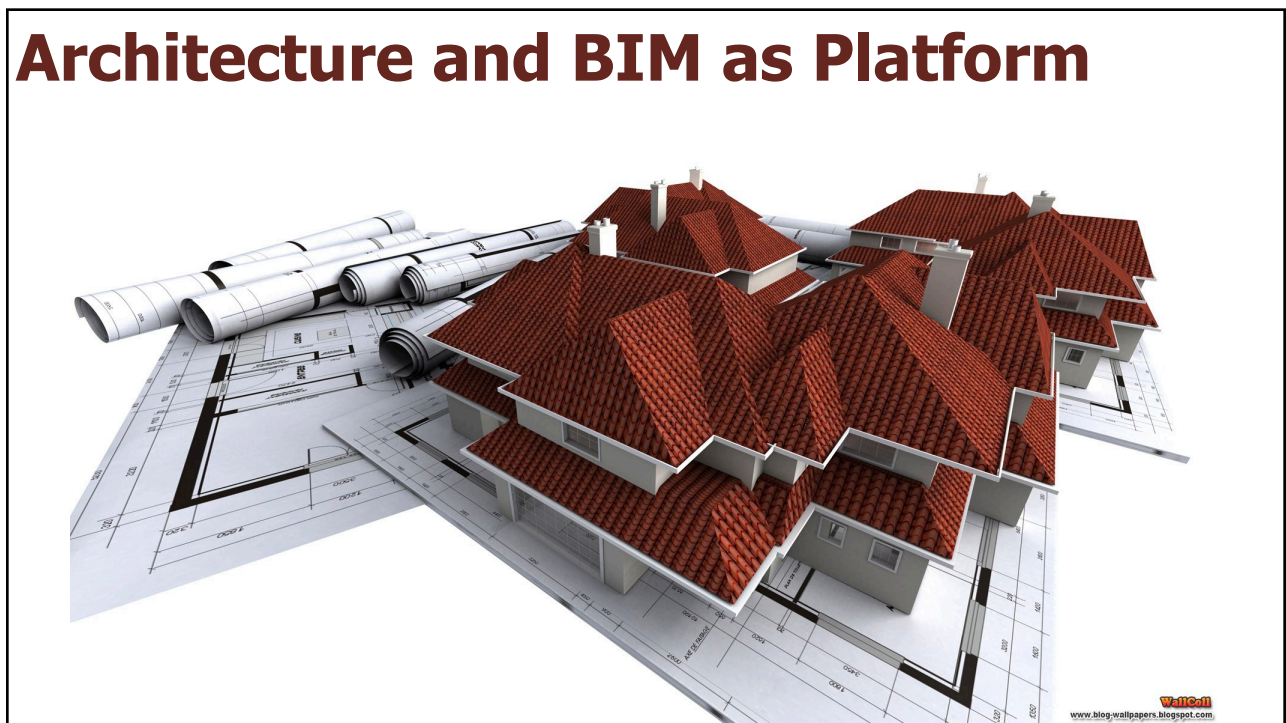
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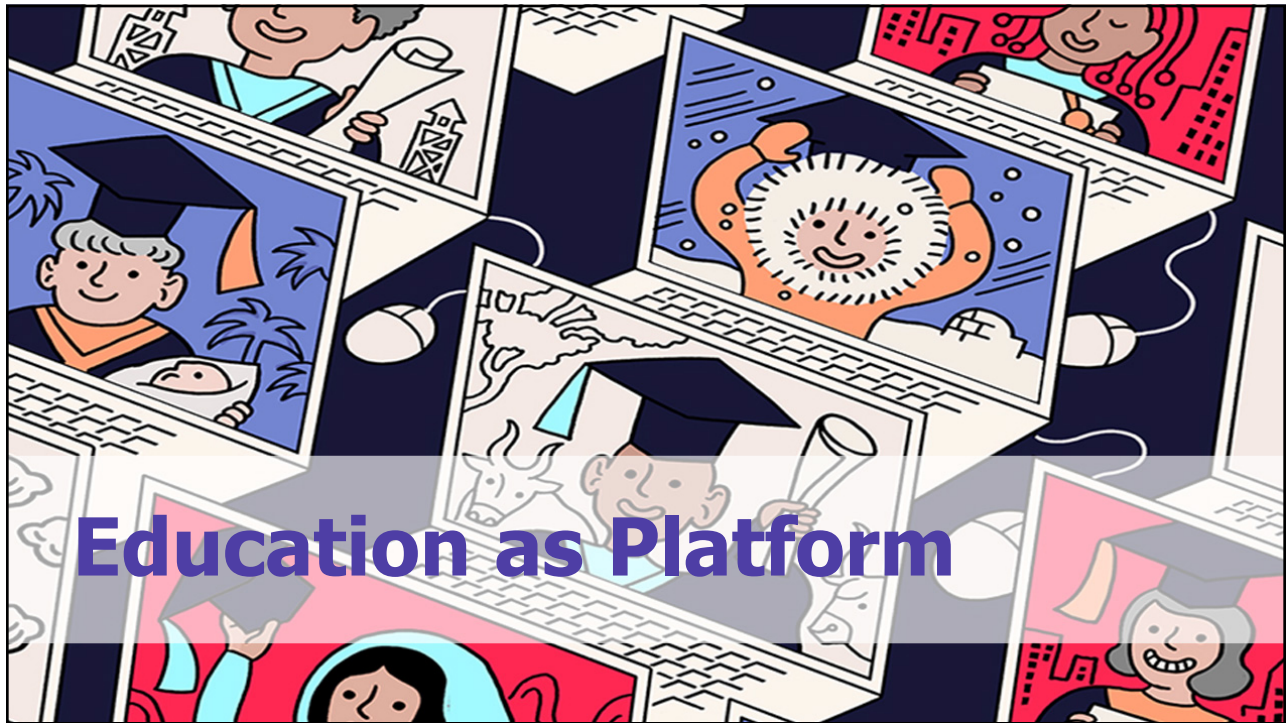


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## Education as Platform

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## Healthcare as Platform

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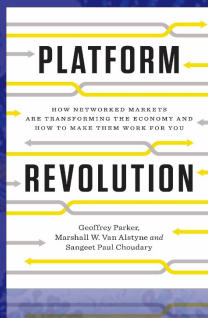


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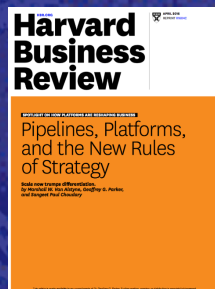
1. Demand economies of scale (i.e. network effects) are creating giant monopolies like those based on supply economies.
2. Business models differ because network effects invert the firm, shifting value creation across all major business functions
3. Platforms beat products every time – faster innovation, appreciate vs depreciate in value, harness resources you don't own
4. Information & Community are key resources. Add them to create margins, innovate, add stickiness, and engineer network effects.
5. Design policy based on how creating platform value (rather than creating privacy or competition per se).

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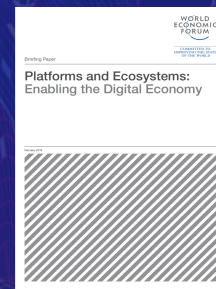
Available on Amazon [here](#).



Pipelines, Platforms & New Rules of Strategy



Platform Ecosystems: How Developers Invert the Firm



Platforms & Ecosystems

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